

Application No.: 10/740,262

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**REMARKS**

Claims 1-25, 28, and 49-57 are pending. Claims 1, 11, 28, 49, 53, and 55 have been amended. Claims 49-57 have been withdrawn from consideration.

Examination and reconsideration of the application, as amended, is requested.

Claims 1, 11, 28, 49, 53, and 55 have been amended for added clarity. Support for the amendments is inherent. Also see, for example, page 4, lines 5-8 and 20-26; page 5, lines 1-8 and 24-30; page 6, lines 1-8; page 7, lines 1-3; page 16, lines 12-25; and the working examples on page 36, line 7 to page 41, line 12.

**Interview Summary**

The undersigned acknowledges with appreciation the in-person interview granted by the Examiner on October 17, 2007, wherein the essence of this amendment and response was discussed.

**§102/§103 Rejections**

-WO 01/56947

Claims 1-25 stand rejected under 35 USC §102(b) as being anticipated by or, in the alternative, under 35 U.S.C. §103(a) as obvious over WO 01/56947.

The rejection of claims 1-25 under 35 USC §102(b) as being anticipated by or, in the alternative, under 35 U.S.C. §103(a) as obvious over WO 01/56947 is unwarranted, and should be withdrawn.

In addition to the comments provided in the Office Action, at the interview, page 4, lines 9-10 was cited for the purpose of showing the amount of  $\text{Al}_2\text{O}_3$ ; page 8, lines 1-7 and page 9, lines 25-30 for showing  $\text{Al}_2\text{O}_3$  and complex  $\text{Al}_2\text{O}_3 \cdot \text{Y}_2\text{O}_3$ ; page 11, lines 3-12 for showing the crystal size; page 12, lines 5-14 for showing a transition alumina (i.e., gamma alumina); and page 19, lines 17-31, bridging sentence, page 20, lines 1-5 for showing graded abrasive particles.

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Notwithstanding the comments in the Office Action and those made at the interview alleging that WO 01/56947 renders claims 1-25 unpatentable as being anticipated or obvious, it is submitted insufficient evidence and analysis has been provided to support either conclusion.

Applicants, in claim 1, broadly claim, a fused polycrystalline material comprising  $\text{Al}_2\text{O}_3$  and  $\text{Y}_2\text{O}_3$ , wherein at least a portion of the  $\text{Al}_2\text{O}_3$  present in the fused polycrystalline material is transitional  $\text{Al}_2\text{O}_3$ , and wherein at least a portion of the  $\text{Al}_2\text{O}_3$  and  $\text{Y}_2\text{O}_3$  present in the fused polycrystalline material are present as a complex  $\text{Al}_2\text{O}_3 \cdot \text{Y}_2\text{O}_3$ .

Applicants, in claim 11, broadly claim, a fused polycrystalline particle comprising  $\text{Al}_2\text{O}_3$  and  $\text{Y}_2\text{O}_3$ , wherein at least a portion of the  $\text{Al}_2\text{O}_3$  present in the fused polycrystalline material is transitional  $\text{Al}_2\text{O}_3$ , and wherein at least a portion of the  $\text{Al}_2\text{O}_3$  and  $\text{Y}_2\text{O}_3$  present in the fused polycrystalline material are present as a complex  $\text{Al}_2\text{O}_3 \cdot \text{Y}_2\text{O}_3$ .

First, as evidenced by the enclosed article entitled "Standard Transition Aluminas, Electron Microscopy Studies, Souza et al. Mat. Res. Vol. 3, No. 4, October 2000, alpha alumina is not a transition alumina (see, e.g., the first sentence of the first full paragraph on page 3, and the first sentence of section 3.7 on page 11).

Second, although alumina, including gamma alumina (a transition alumina), is used as a raw material in WO 01/56947 in making their reported fused  $\text{Al}_2\text{O}_3 \cdot \text{Y}_2\text{O}_3$  abrasive material (particles), there is no evidence provided in the rejection that the resulting fused material would include a transition alumina. Given that the process for making the reported fused  $\text{Al}_2\text{O}_3 \cdot \text{Y}_2\text{O}_3$  abrasive material (particles) involves melting the raw materials together, and hence destroying whatever crystalline structure the raw material had, it is unclear how it can be concluded that the resulting fused  $\text{Al}_2\text{O}_3 \cdot \text{Y}_2\text{O}_3$  abrasive material (particles) would include a transition alumina phase<sup>1</sup>, or why would skilled in the art would be properly motivated to even try, with a reasonable expectation of success, to include a transition alumina phase in the resulting fused material (particles).

Claims 2-10 depend from, and add an additional limitation(s) to, claim 1. Claim 1 is patentable, for example, for reasons given above. Therefore, claims 2-10 should also be patentable.

<sup>1</sup> The presence of alpha alumina and a complex  $\text{Al}_2\text{O}_3 \cdot \text{Y}_2\text{O}_3$  is reported for Examples 1-5 and 7.

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Claims 12-25 depend from, and add an additional limitation(s) to, claim 11. Claim 11 is patentable, for example, for reasons given above. Therefore, claims 12-25 should also be patentable.

In summary, the rejection of claims 1-25 under 35 USC §102(b) as being anticipated by or, in the alternative, under 35 U.S.C. §103(a) as obvious over WO 01/56947 is unwarranted, and should be withdrawn.

-U.S. 20030115805

Claims 1, 2, 6, 7, 11, 12, 15-18, 22-25, and 28 stand rejected under 35 USC §102(a) as being anticipated by or, in the alternative, under 35 U.S.C. §103(a) as obvious over U.S. 20030115805.

The rejection of claims 1, 2, 6, 7, 11, 12, 15-18, 22-25, and 28 under 35 USC §102(a) as being anticipated by or, in the alternative, under 35 U.S.C. §103(a) as obvious over U.S. 20030115805 is unwarranted, and should be withdrawn.

In addition to the comments provided the Office Action, at the interview, paragraph 0023 was cited for the purpose of showing  $\text{Al}_2\text{O}_3$ ; paragraph 0024, for showing graded abrasive particles; paragraph 0057 for showing the amount of  $\text{Al}_2\text{O}_3$ ; paragraph 0066 for the showing transitional alumina (i.e., gamma alumina); paragraph 0077 for showing the first step method claim 28; paragraph 0093 for showing the second step of method claim 28; paragraph 0098 for showing complex  $\text{Al}_2\text{O}_3 \cdot \text{Y}_2\text{O}_3$ ; paragraph 0103 for showing crystal size; paragraph 0108 for showing the amount of crystals; and paragraph 0109 for showing graded abrasive particles.

Notwithstanding the comments in the Office Action and made at the interview alleging that U.S. 20030115805 renders Applicants claims 1, 2, 6, 7, 11, 12, 15-18, 22-25, and 28 unpatentable as being anticipated or obvious, it is submitted insufficient evidence and analysis has been provided to support either conclusion.

Applicants, in claim 1, broadly claim, a fused polycrystalline material comprising  $\text{Al}_2\text{O}_3$  and  $\text{Y}_2\text{O}_3$ , wherein at least a portion of the  $\text{Al}_2\text{O}_3$  present in the fused polycrystalline material is transitional  $\text{Al}_2\text{O}_3$ , and wherein at least a portion of the  $\text{Al}_2\text{O}_3$  and  $\text{Y}_2\text{O}_3$  present in the fused polycrystalline material are present as a complex  $\text{Al}_2\text{O}_3 \cdot \text{Y}_2\text{O}_3$ .

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Applicants, in claim 11, broadly claim, a fused polycrystalline particle comprising  $\text{Al}_2\text{O}_3$  and  $\text{Y}_2\text{O}_3$ , wherein at least a portion of the  $\text{Al}_2\text{O}_3$  present in the fused polycrystalline material is transitional  $\text{Al}_2\text{O}_3$ , and wherein at least a portion of the  $\text{Al}_2\text{O}_3$  and  $\text{Y}_2\text{O}_3$  present in the fused polycrystalline material are present as a complex  $\text{Al}_2\text{O}_3 \cdot \text{Y}_2\text{O}_3$ .

Applicants, in claim 28, broadly claim, a method of making fused polycrystalline material, the method comprising:

heating a first fused polycrystalline material, the first fused polycrystalline material comprising  $\text{Al}_2\text{O}_3$  and  $\text{Y}_2\text{O}_3$ , wherein at least a portion of the  $\text{Al}_2\text{O}_3$  is transitional  $\text{Al}_2\text{O}_3$ , and wherein at least a portion of the  $\text{Al}_2\text{O}_3$  and  $\text{Y}_2\text{O}_3$  are present as a complex  $\text{Al}_2\text{O}_3 \cdot \text{Y}_2\text{O}_3$  to convert at least a portion of the first fused polycrystalline material to alpha alumina to provide a second fused polycrystalline material, the second fused polycrystalline material comprising (a) alpha alumina having an average crystallite size in a range from 1 to 10 micrometers, and (b) complex  $\text{Y}_2\text{O}_3$  metal oxide present as a distinct crystalline phase.

First, as discussed above, alpha alumina is not a transition alumina.

Second, Applicants are claiming a fused polycrystalline material (Claim 1), fused polycrystalline particles (Claim 11), and method for making fused polycrystalline material (Claim 28). On page 7, lines 1-3 of Applicants specification, the term "fused polycrystalline" is stated to "[refer] to crystalline material cooled directly from a melt and crystalline material made by heat-treating crystalline material cooled directly from a melt (e.g., alpha alumina made heat-treating transitional alumina cooled directly from a melt)". That is, Applicants are claiming a specific type of material- a *fused* polycrystalline material.

Third, although alumina, including gamma alumina (a transition alumina), is used as a raw material in U.S. 20030115805, the process for using this raw material therein involves melting the raw material, and hence destroying whatever crystalline structure the raw material had. Notwithstanding that in paragraph 0098 the examples of crystalline phases listed includes  $\text{Al}_2\text{O}_3$  (including listing alpha alumina as an example of a crystalline alumina; although not listed another possibility would be a transition alumina), and a number of other oxides, including complex metal oxides (e.g., complex  $\text{Al}_2\text{O}_3 \cdot \text{Y}_2\text{O}_3$ ), there is no specific reference to a fused (polycrystalline) material or particle that includes both transition alumina and a complex  $\text{Al}_2\text{O}_3 \cdot \text{Y}_2\text{O}_3$  (i.e., a specific combination). Moreover, it is unclear how it can be concluded that U.S. 20030115805 anticipates

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claims 1, 11, and 28, or why would skilled in the art would be properly motivated to try, with a reasonable expectation of success, to provide a fused polycrystalline material or particle as required in Applicants claims.

Claims 2, 6, and 7 depend from, and add an additional limitation(s) to, claim 1. Claim 1 is patentable, for example, for reasons given above. Therefore, claims 2, 6, and 7 should also be patentable.

Claims 12, 15-18, and 22-25 depend from, and add an additional limitation(s) to, claim 11. Claim 11 is patentable, for example, for reasons given above. Therefore, claims 12, 15-18, and 22-25 should also be patentable.

In summary, the rejection of claims 1, 2, 6, 7, 11, 12, 15-18, 22-25, and 28 under 35 USC §102(a) as being anticipated by or, in the alternative, under 35 U.S.C. §103(a) as obvious over U.S. 20030115805 is unwarranted, and should be withdrawn.

-U.S. 6,641,631 B2 (Thomas et al.)

Although not included in the Office Action mailed September 11, 2007, at the in-person interview, the Examiner also brought up a new reference to consider: U.S. 6,641,631 B2 (Thomas et al.). Specific reference was made at the interview to col. 2, lines 40-43. It is understood that '631 (Thomas et al.) was brought up to show<sup>2</sup> that commercial alpha alumina includes gamma alumina and delta alumina (transition alumina) as impurities, and hence may be attempt to be used with either WO 01/56947 or 20030115805 to reject Applicants' claims.

Notwithstanding that it is stated in col. 2, lines 41-42 that "[c]ommercially available alpha-alumina contains the gamma and delta phases as impurities"; no evidence has been provided that this statement is referring to fused alumina, let alone fused polycrystalline alumina. Applicants' claims all require a fused polycrystalline material or particles. Other non-fusing techniques for making aluminas include sol-gel derived alumina, calcined/sintered natural or synthetic bauxite, calcined/sintered aluminum oxide hydrates, calcined/sintered precipitated salt solutions.

Given that there is no evidence that the alpha-alumina containing the transitional alumina phases of gamma and delta phases referred to in '631 (Thomas et al.) is a fused material, and that there are a variety of non-fused techniques, which are fundamentally different from a fusing

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method, it is submitted that even with '631 (Thomas et al.) there still is insufficient evidence provided to properly reject Applicants' claims as anticipated or obvious under §102 or §103(a), respectively.

In view of the above, it is submitted that the application is in condition for allowance. Examination and reconsideration of the application as amended is requested.

Respectfully submitted,

Date

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<sup>2</sup> '631 Thomas fails to include other requirements of Applicants' claims such as a complex  $Al_2O_3 \cdot Y_2O_3$